

# Searching for the maximum

The real-valued function  $f(x)$ , defined for  $0 \leq x \leq 1$ , has a single maximum at  $x = m$ .

If  $0 \leq u < v \leq m$  then  $f(u) < f(v)$ , and  
if  $m \leq u < v \leq 1$  then  $f(u) > f(v)$ .

You are told nothing else about  $f$ , but you may ask for the value of  $f(x)$  at any values of  $x$  you choose.

How would you find the approximate value of  $m$ ?

How accurately could find  $m$  if you could ask the value of  $f(x)$  at only 10 values of  $x$ ?